REMARKS

The formal rejections are traversed by claim amendments above where:

$$\phi = k_t \sqrt{\frac{\pi}{\omega_0 C_0 Z_0 A}} \operatorname{sinc}(\omega/2\omega_0) \quad \cdots (1)$$

$$C' = \frac{-C_0}{k_t{}^2 \operatorname{sinc}(\omega/\omega_0)} \quad \cdots (2)$$

(1) The electric transformer ratio Φ is the electric transformer ratio which is analogous to the turn ratio. Generally, when the turn ratio is represented by the relation of '1: n', n is an integer. But, in this application, Φ of the relation '1: Φ' is a complex number which depends on the frequency and

(2) Parameters of the equation (1) and (2)

- k_t: electric mechanical coupling coefficient of thickness mode,
- C_0: electrostatic capacitance of piezoelectric plate,
- A: cross section,
- $\omega_0 = 2\pi f_0$ (f_0 is the free resonance frequency),
- $\omega = 2\pi f$ (f is frequency), 'c' of the equation (2) is not parameter but a part of the function name as follows.

  sinc(X) = sinc (πX) / πX.
- $(Z_f)^{(0)}$ is Z_f (an effective impedance of front load viewed from the front side of the piezoelectric plate) at the free resonant frequency. The free resonant frequency means the resonant frequency of piezoelectric plate without any matching layers and back absorption layer on it.

$$\ln\frac{Z_{i+1}}{Z_i} = 2^{-n}C_i^n \ln\frac{Z_t}{Z_f^{(0)}} \qquad \cdots(3)$$

- In equation (3), n is the number of matching layers.
- Z_i is the impedance of the i-th matching layer to the front load side from the piezoelectric plate. So, Z_0 is the impedance of the piezoelectric plate.
- The free resonant frequency means the resonant frequency of piezoelectric plate without any matching layers on and back absorption layer on it.
- Z_t : Acoustic impedance of front load material
- $C_n^i = \dfrac{n!}{(n-i)!\,i!}$
- The superscripts 3/4, 7/8, 1/2, 1/8 etc means the exponent from the calculation using the above equation (3).

For example, if order 'i' is 1 and the matching layer number n is 3, the calculated result of exponent is as follows.

$$\ln\frac{Z_1}{Z_0} = 2^{-1}C_1^0 \ln\frac{Z_t}{Z_f^{(0)}}$$

$$\frac{Z_1}{Z_0} = \left(\frac{Z_t}{Z_f^{(0)}}\right)^{\frac{1}{2}}$$

$$Z_1 = Z_0 \times Z_t^{\frac{1}{2}} \times (Z_f^{(0)})^{-\frac{1}{2}}$$

$$\therefore Z_1 = (Z_f^{(0)} Z_t)^{\frac{1}{2}}$$

Reconsideration and allowance are, therefore, requested.

Respectfully submitted,

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